

REMARKS

Claims 1 and 12 have been amended. Claims 1-19 remain for further consideration. No new matter has been added.

The objections and rejections shall be taken up in the order presented in the Official Action.

1. Claim 5 currently stands rejected to for allegedly being of improper dependent form. Specifically, the Official Action contends that “*if the second motion vector is zero vector, it only uses one vector which broadens the preceding claim*” (i.e., claim 1 from which claim 5 directly depends). (Official Action, pg. 2).

It is respectfully submitted that if the second motion vector is a zero vector, a broadening of claim 1 does not occur. The use of “a second motion vector” is explicitly recited in the features of claim 1 of “*selecting a third pixel from the first input image and assigning a third video information value to the third pixel using a second motion vector*” and “*selecting a fourth pixel from the second input image and assigning a fourth video information value to the fourth pixel using the second motion vector*”. If the second motion vector is a zero vector, the two “selecting” steps are still carried out and results achieved (i.e., third and fourth video information values are assigned). The same holds true regarding the results achieved if the second motion vector is not a zero vector. Also, the subsequent “mixing” step of claim 1 is also carried out and results achieved (i.e., to obtain a video information value of the pixel of the intermediate image) using the third and fourth video information values that were assigned in the two “selecting”

steps noted above. Again, the same holds true regarding the results achieved if the second motion vector is not a zero vector.

In light of the foregoing, it is respectfully submitted that the objection to claim 5 is now moot and should be removed, and that claim 5 is in condition for allowance.

2. Claims 1, 3-12 and 14-19 currently stand rejected for allegedly being obvious in view of the combined subject matter disclosed in U.S. Patent 5,526,053 to Dorricott (hereinafter “Dorricott”) and U.S. Patent 5,446,497 to Keating (hereinafter “Keating”).

Claim 1

Claim 1 recites a method for motion-vector-aided interpolation of a pixel of an intermediate image lying between two input images. The method includes, *inter alia*, the steps of:

“mixing the video information values by multiplying the first video information value by a first weighting factor, the second video information value by a second weighting factor, the third video information value by a third weighting factor, and the fourth video information value by a fourth weighting factor and adding the weighted video information values to obtain a video information value of the pixel of the intermediate image, the weighting factors being chosen such that the video information value of the pixel of the intermediate image lies within the determined first or second intervals.” (cl. 1)

The Official Action contends that Dorricott teaches everything in claim 1, except for the “mixing” step noted above. (Official Action, pgs. 2-3). The Official Action then contends that “*Keating et al. teaches mixing of the video information values with the weighted video information (interpolation coefficient) values so obtained in order to obtain a video information value of the pixel of the intermediate image (output field), the weighting factors being chosen such that this video information value lies within the interval determined (The output pixel is*

obtained by combining the values of the pixels located in the progressive scan frame.) (col. 15 lines 36-66)." (Official Action, pg. 4). The Official Action concludes that *"at the time of the invention it would have been obvious to a person of ordinary skill in the art to mix video information with weighting factor to predict interpolated pixel in the method of Dorricott et al. The suggestion/motivation for doing so would have been that to locate the appropriate pixels in the pair of frames are combined to produced optimized output pixel and both references are for the use and processing of motion vectors. Therefore, it would have been obvious to combine Keating et al. with Dorricott et al. to obtain the invention as specified in claim 1."* (Official Action, pg. 5). It is submitted that this rejection is flawed and based on an impermissible reading of the references, in particular, Keating.

In light of the U.S. Supreme Court decision in the KSR case (*KSR Int'l v. Teleflex Inc.*, 127 S.Ct. 1727, 82 USPQ2d 1385 (2007)), the U.S. Patent & Trademark Office ("PTO") promulgated a set of *"Examining Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc."*, effective October 10, 2007. (72 Fed. Reg. 57526 *et seq.*) (hereinafter the "Guidelines"). The Guidelines *"are intended to assist Office personnel to make a proper determination of obviousness under 35 U.S.C. 103, and to provide an appropriate supporting rationale in view of the recent decision by the Supreme Court in KSR International Co. v. Teleflex Inc. (KSR)"*. (72 Fed. Reg. at 75726.) Section III of the Guidelines provides several *"Rationales To Support Rejections Under 35 U.S.C. 103"*. (72 Fed. Reg. at 57528.) That section states that *"Office personnel must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art. ... The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The*

*Supreme Court in KSR noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit.” (72 Fed. Reg. at 57528; emphasis added). One of the stated Rationales is that there be “Some Teaching, Suggestion, or Motivation in the Prior Art That Would have Led One of Ordinary Skill To Modify the Prior Art Reference or To Combine Prior Art Reference Teachings To Arrive at the Claimed Invention”. Specifically, “[t]he rationale to support a conclusion that the claim would have been obvious is that ‘a person of ordinary skill in the art would have been motivated to combine the prior art to achieve the claimed invention **and that there would have been a reasonable expectation of success**’.” (72 Fed. Reg. at 57534, emphasis added) (citing *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1360, 80 USPQ2d 1641, 1645 (Fed. Cir. 2006). Further, “[i]f any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claims would have been obvious to one of ordinary skill in the art”. (72 Fed. Reg. at 57534).*

As applied to the instant situation, the teachings of Keating discussed below are such that no reasonable expectation of success would exist if Keating were combined with Dorricott in the manner suggested in the Official Action. This is because Keating fails to disclose or suggest the features of claim 1 noted above of “*mixing the video information values by multiplying the first video information value by a first weighting factor, the second video information value by a second weighting factor, the third video information value by a third weighting factor, and the fourth video information value by a fourth weighting factor and adding the weighted video information values to obtain a video information value of the pixel of the intermediate image.*” Keating, in the cited section in the Official Action of column 15, lines 36-66, discloses that “*the interpolator 41 generates the pixels of each output field by interpolation between the two progressive scan frames supplied thereto for that output field, each output field consisting of*

alternate lines of pixels in dependence upon whether the field is an odd field or an even field to provide the required 2:1 interlace in the output signal. For each output pixel, the interpolator 41 uses the motion vector supplied for that output pixel, and the correct temporal position along the motion vector for output pixels in that field, as indicated by the interpolation coefficient $I(A:B)$ supplied thereto, to locate the appropriate pixels in the pair of progressive scan frames which are to be combined to produce the output pixel. The value of each output pixel is obtained by combining the values of the pixels located in the progressive scan frames with appropriate weighting in dependence upon the interpolation coefficient as described earlier. For example, an interpolation coefficient of 0.8 indicates that the values of the pixels located in the two progressive scan frames should be combined in the ratio 2/10:8/10, so that the frame which is temporally nearer to the output field contributes more to the output pixels than the frame which is temporally further from the output field. Similarly, for example, an interpolation coefficient of 0.2 indicates that the pixels of an output field should be produced by combining the pixels in the two progressive scan frames in the ratio (the "interpolation ratio") 8/10:2/10. The output of the interpolator 41 is a series of 50 Hz 2:1 interlace format fields, corresponding to 625 lines/frame, providing high quality motion portrayal when displayed.” (emphasis added).

Keating thus merely teaches that each interpolated output pixel results from an application of the interpolation coefficient $I(A:B)$ to two pixels associated with a single motion vector, with a first one of the two pixels being in a first one of the two progressive scan frames and the second one of the two pixels being in a second one of the two progressive scan frames. Keating fails to teach or suggest that the interpolated pixel results from the use of: (1) two motion vectors; (2) each vector having two pixels for a total of four pixels; and (3) two interpolation coefficients – one for each motion vector, as in the present claimed invention. The

present claimed invention obtains the video information value of the pixel of the intermediate image using the four video information values associated with the corresponding four pixels and two motion vectors using four multiplication operations involving four weighting factors. As a result of the use of two pixels instead of four pixels, the interpolated pixel in Keating contains less video information than the interpolated pixel in the present claimed invention. In addition, Dorricott, in the cited section of column 9, lines 19-29 which refer to FIG. 9, discloses the use of two motion vectors V_a and V_b in determining a block 520 of pixels of the output field: *“projection of the motion vectors V_a and V_b along the respective vector directions leads to a block 520 of the output field being assigned both of the motion vectors V_a and V_b .”* Since Keating, as discussed above, teaches the use of a single motion vector instead of two motion vectors in determining the interpolated pixel, there is no reasonable expectation of success of achieving all of the features of the “mixing” step of claim 1 and also of determining the block 520 of pixels of the output field of Dorricott if the teachings of Dorricott and Keating were combined as suggested in the Official Action. Thus, the combined teachings of Dorricott and Keating fails to disclose at least the features of claim 1 of *“mixing the video information values by multiplying the first video information value by a first weighting factor, the second video information value by a second weighting factor, the third video information value by a third weighting factor, and the fourth video information value by a fourth weighting factor and adding the weighted video information values to obtain a video information value of the pixel of the intermediate image, the weighting factors being chosen such that the video information value of the pixel of the intermediate image lies within the determined first or second intervals.”* As such, the combined references are incapable of rendering claim 1 obvious.

In light of the foregoing, it is respectfully requested that the obviousness rejection with respect to claim 1 is moot and should be removed, and that claim 1 is in condition for allowance.

Claim 12

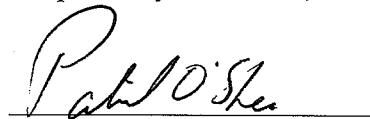
As claim 12 currently stands rejected for the identical reasons as claim 1, the arguments above with respect to claim 1 are equally applicable to claim 12. As a result, it is respectfully requested that the obviousness rejection with respect to claim 12 is moot and should be removed, and that claim 12 is in condition for allowance.

3. The indication that claims 2 and 13 are objected to but would be allowable if rewritten to no longer depend on a rejected base claim is noted and appreciated.

For all the foregoing reasons, reconsideration and allowance of claims 1-19 is respectfully requested.

If a telephone interview could assist in the prosecution of this application, please call the undersigned attorney.

Respectfully submitted,

A handwritten signature in cursive script, reading "Patrick J. O'Shea", is written over a horizontal line.

Patrick J. O'Shea
Reg. No. 35,305
O'Shea, Getz & Kosakowski, P.C.
1500 Main Street, Suite 912
Springfield, MA 01115
(413) 731-3100, Ext. 102